

<p>2001-124230/14 A97 D13 (A14 A25 D16) BADI 1999.06.25 BASF AG *DE 19929257-A1 1999.06.25 1999.1029257(+1999DE-1029257) (2000.12.28) A23K I/165</p> <p>Production of polymer-coated granulated animal feed additive, useful in production of pelletized animal feed, involves granulating mixture of carrier and enzyme and coating with suitable organic polymer</p> <p>C2001-036281 Addnl. Data: HARZ H, BETZ R, SCHOENER F, MEESTERS G M, ANDELA C S M</p>	<p>A(11-B5B1, 12-W9) D(3-G1, 3-G6, 5-H13)</p> <p>necessary, the coated granulate is dried, cooled and/or freed from coarse particles.</p> <p>INDEPENDENT CLAIMS are also included for:</p> <p>(1) granulated animal feed additives of this type, coated with a specified organic polymer; and</p> <p>(2) pelletized animal feed compositions containing additive(s) of this type mixed with usual constituents.</p>
<p>NOVELTY Production of a polymer-coated granulated animal feed additive containing enzyme(s).</p> <p>DETAILED DESCRIPTION Production of a polymer-coated granulated animal feed additive containing enzyme(s) comprises:</p> <p>(1) granulating a mixture of a suitable feed carrier and enzyme(s); and</p> <p>(2) coating the granulate with a suitable organic polymer (I) by spraying the granulate with a melt, solution or dispersion of (I) or coating with (I) powder in a fluidized bed or in a mixer. If</p>	<p>USE The additive is used in the production of pelletized animal feed compositions (claimed).</p> <p>ADVANTAGE Heat treatment of feed to improve its keeping quality and the effect of heat during extrusion and expansion causes problems if the feed contains enzymes, which are usually thermally unstable. One method of stabilizing the enzymes involves pelletizing a mixture with a carrier (mainly cereal flour). Granulation of a mixture with cellulose fibers and coating in several alternating stages with a high-melting fat</p> <p>DE 19929257-A*</p>

or wax and a composition containing a large amount of inorganic filler is also possible but gives a hydrophobic granulate that tends to become sticky during storage. The present additives have excellent stability to pelletization, protect the enzymes effectively and greatly increase the storage stability of the enzymes, especially in mineral feed and mineral premixes.

SPECIFIC COMPOUNDS

A specific example of the enzyme is phytase.

EXAMPLE

The granulate containing phytase to be coated had a residual moisture content of 6-7%, activity of about 6500 units/g, maximum particle size of 850 µm and average particle size of (A) 550, (B) 700 µm. (A) 700, (B) 750 g granulate were heated to 45°C in a fluidized bed. Sample (A) was then coated with a solution of 78 g polyvinyl alcohol Mowiol 8/88 (RTM) in 702 g deionized water containing 14.5 g dispersed talc to reduce the stickiness of the coating. The dispersion at 35°C was sprayed onto the granulate for 540 minutes at a rate of 1-2 g/minute and pressure of 1.5-2 bar and 140 m³/hour air at 45-52°C were introduced for fluidization and drying, then the product at 45°C was dried for 25 minutes in 100 m³/hour air and cooled to 30°C in the

fluidized state. Control (B) was coated with 321 g molten hardened beef tallow Edekor NHTT-G (RTM) at 100-120°C, by spraying for 15 minutes, using spraying gas at 3 bar and 85-90°C. The product was then cooled to 30°C, using 50 m³/hour air for fluidization. The products had a residual moisture content of (A) 4, (B) 6-8%; phytase activity of about (A) 6000, (B) 5500 units/g. The amount of coating was (A) 9.5, (B) 30 wt.-% coating was (A) relatively rough and compact, (B) smooth and compact. 500 ppm granulate were mixed with a standard animal feed comprising 20.7% maize, 40.0% barley, 10.0% manioc, 13.0% oats, 3.0% soya, 3.0% fish meal, 0.84% wheat grits bran, 0.5% soya oil, 1.2% lime, 0.2% salt, 0.06% trace elements, 0.05% methionine, 0.05% choline chloride (50%) and 0.4% calcium propionate. The mixture was then pelletized so that the pellets reached a temperature of (A) 85, (B) 80°C. The relative improvement in the retention of the enzyme (phytase) activity (with and without the coating) was (A) 19/66, (B) 24/74 (19/66 indicated 66% retention with and 55.5% retention without coating).

TECHNOLOGY FOCUS

Food - Preferred Process: The granulate is produced by extrusion, mixer granulation, fluidized bed granulation, dish agglomeration or

2001-124230/14	<p>compaction of a mixture of carrier and a solution containing enzyme(s). It is then made spherical before coating. The granulate has a narrow particle size distribution. Granulation and/or coating is carried (dis)continuously. An (non)aqueous polymer solution or dispersion is used for coating.</p> <p>Preferred Feed Additive: The additive has an average particle size of about 0.4-2 mm. The enzyme content is $1 \cdot 10^3$ to $1 \cdot 10^5$ units phytase/g.</p> <p>Polymers - Coating: (claimed) The coating consists of a polymer selected from polyalkylene glycols (I), especially polyethylene glycols, with a number average molecular weight (Mn) of about 400-15000; polyalkylene oxide (co)polymers (II) with Mn 4000-20000, especially block copolymers of polyoxyethylene and polyoxypropylene; polyvinylpyrrolidones (III) with Mn 7000-100000; vinyl pyrrolidone/vinyl acetate copolymers (IV) with Mn 30000-100000; polyvinyl alcohols (V) with Mn 20000-100000; hydroxypropylmethylcelluloses (VI) with Mn 6000-80000; alkyl (meth)acrylate (co)polymers (VII) with Mn 100000-1000000, especially ethyl acrylate/methyl methacrylate and methyl acrylate/ethyl acrylate copolymers; and polyvinyl acetates (VIII) with</p>	<p>Mn 250000-700000, optionally stabilized with polyvinylpyrrolidone.</p> <p>Preferred Coating Compositions: Preferred (non)aqueous polymer solutions and dispersions used for coating contain (a) 10-50 wt.% polymer(s) selected from (I), (II), (III), (IV), (V) and (VI); or (b) 10-40 wt.% polymer(s) selected from (VII) and (VIII). Powder coating preferably is carried out with (VI) mixed with a plasticizer. The polymer(s) used for melt coating are selected from (I) with Mn 1000-15000 and (b) (II).</p> <p>Biology - Preferred Enzymes: The feed contains enzyme(s) selected from oxidoreductases, transferases, lyases, isomerases, ligases, phosphatases, preferably phytase, and hydrolases, preferably an enzyme decomposing non-starch polysaccharides. In particular, it contains phytase in an amount of $1 \cdot 10^3$ to $1 \cdot 10^5$ units/g. (13pp0016DwgNo.0/2)</p>
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